

# Measurement of electromagnetic radiation at RHIC-PHENIX

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Early stages of heavy ion collisions can be extensively investigated through electromagnetic radiation such as direct photons or dileptons. Since photons and dileptons don't interact strongly with the medium once produced, they are expected to directly carry out information about thermodynamical quantities such as degrees of freedom and temperature, which help determine the thermalization time of the system.

The PHENIX experiment at RHIC has measured direct photons in p+p, d+Au and Au+Au, and dielectrons in d+Au, Cu+Cu and Au+Au at  $\sqrt{s_{NN}}=200$  GeV. The yield of direct photons for  $p_T > 5$  GeV/c is found to be consistent with the expectation from NLO pQCD calculations in p+p and d+Au collisions, while the data lie above results from a NLO pQCD calculation for  $p_T < 5$  GeV/c in central Au+Au collisions, though the calculation is albeit questionable at this region. The dilepton results suggest a hint of an excess over hadron decays in  $M_{ee}=0.4-0.6$  GeV/c<sup>2</sup> in central Au+Au collisions. Since both direct photons and dileptons from a hot dense medium are produced via similar processes, a comparison of the two results can elucidate the common production mechanism. Such a comparison is possible with a help of baseline measurements in p+p and d+Au collisions, where a dense medium is not expected to be produced.

In this presentation, we will summarize observations on electromagnetic radiation from the PHENIX experiment at RHIC, and discuss what we have learned from them.